

WHAT IS CLAIMED IS:

1. A method of fabricating a semiconductor device including a crystalline active layer crystallized by performing thermal annealing to an amorphous silicon layer, characterized in that:

5 the thermal annealing process for crystallizing the amorphous silicon layer is consecutively performed within one equipment after a process of depositing a MIC source metal onto the amorphous silicon layer and before a second material deposition process.

10 2. The method as claimed in Claim 1, wherein the second material deposition process is a process of depositing a wiring metal layer onto the active layer.

15 3. The method as claimed in Claim 1, wherein the second material deposition process is a process of forming an insulating layer for forming contact holes.

20 4. The method as claimed in Claim 1, wherein the second material deposition process is a process of forming a gate insulating film and a gate electrode onto the active layer.

5. The method as claimed in Claim 1, wherein the second material deposition process is a process of forming a gate electrode.

25 6. The method as claimed in Claim 1, wherein a substrate of the semiconductor device is heated during the process of applying the MIC source metal.

7. The method as claimed in Claim 6, wherein the substrate is heated to a temperature of 200°C or higher.

30 8. The method as claimed in anyone of Claims 1, wherein the thermal annealing process is performed under vacuum.

9. The method as claimed in Claim 8, wherein the vacuum pressure during the thermal annealing process is within a range of 10 to 1.0×10^{-10} Torr.

5 10. The method as claimed in Claim 8, wherein a temperature during the thermal annealing process is 300°C or higher.

10 11. The method as claimed in anyone of Claims 1 to 5, further comprising a process of implanting impurities into the active layer before the thermal annealing process of the active layer and being characterized in that the impurities are activated during the thermal annealing of the active layer.

15 12. The method as claimed in anyone of Claims 1 to 5, further comprising an additional thermal annealing process for improving crystallization of the active layer.

13. The method as claimed in Claim 2, wherein the MIC source metal is used for the wiring metal layer.

20 14. The method as claimed in Claim 3, wherein a substrate of the semiconductor device is heated during the process of forming the insulating layer.

25 15. The method as claimed in Claim 14, wherein the heating temperature of the substrate is lower than the thermal annealing temperature of the active layer.

30 16. The method as claimed in anyone of Claims 1 to 5, wherein at least one material selected from a group consisting of Ni, Pd, Ti, Ag, Au, Al, Sn, Sb, Cu, Co, Cr, Mo, Tr, Ru, Rh, Cd, Pt, or a combination thereof is used as the MIC source metal.

17. The method as claimed in anyone of Claims 1 to 5, wherein the semiconductor device is a thin film transistor.